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Copy 10 of 10

16 September 63

MEMORANDUM FOR THE RECORD

SUBJECT : OXCART Suppliers Briefing on 12 September 1963

I. Subject briefing was attended by representatives of Lockheed, Pratt & Whitney, [redacted]. Headquarters was represented by appropriate members of OSA and USAF

25X1A

II. Mr. Johnson, LAC, opened the briefing by assuring everyone that the program was not suffering from lack of personnel, lack of cooperation or priorities. LAC has a thorough knowledge of the priority of the program, and unquestionably, it is number one. He stated that he was fully aware of the fact that unless the A-12 works, there would be no future programs. In addition, Mr. Johnson highlighted the following points:

A. LAC has gone to outsiders, such as NASA, for assistance but have found no application of the NASA data to air-breathing engines or to the extreme temperatures associated with the A-12.

B. He does not believe any major configuration changes will be necessary to solve the various technical problems.

C. As of 9 September, LAC was working in five different wind tunnels in support of the program, two LAC tunnels and three NASA tunnels, but none of these will provide data with engines running.

25X1A

D. Aircraft #130 will be delivered to [redacted] this month.

E. There is no interference between the A-12 and the AF-12 programs. On the day that 30 people were seen to be working on 1001, fourteen were from Hughes and eight were aircraft assembly mechanics.

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Control System

25X1A

[redacted]-3274-63
Page 2

F. LAC will now go back into the wind tunnel to check the A-12 configuration being flown.

G. If necessary, the ejector flaps will be fixed rigid to prevent ejector flap flutter from causing pressure disturbances back into the engine.

III. The remainder of Mr. Johnson's presentation consisted of presenting a series of slides, attached herewith, which are relatively self explanatory.

25X1A IV. [redacted] Pratt & Whitney presentation consisted of the following:

A. Engine development status:
JT11D-20 engine ground test hours - 6400
Engine ground test hours at Mach 3 conditions - 1000
Total engine flight hours - 220

B. Excessive engine oil consumption during flight, which was not surfaced during development ground testing, has been determined to be caused by leakage past the number 2 bearing oil seal primarily during current flight test conditions where the aircraft operates below the 400 knot design equivalent airspeed. Operation below this airspeed results in a reduction in pressure differential between compressor discharge or turbine cooling air and breather or scavenging oil pressure. When this happens, the seal separating these compartments because of insufficient pressure in the design direction permits leakage from the scavenging system into the air stream and on out the tailpipe. An engineering change involving a reconfigured seal with a dry face has been tested and will be incorporated on production engine #235 scheduled for delivery late this month.

25X1A

[redacted]3274-63
Page 3

C. Nine failures of the afterburner rigimesh liner have occurred to date. Cause of these failures is attributed to an unidentified induced vibration which did not show up during the development ground test program. The vibration may be a result of one or a combination of the following: combustion phenomena, afterburner screech, or engine to airframe installation factors such as the so-called "roughness," nacelle/engine mounting structure deflections, and possibly airflow distribution. An engineering change replacing the rigimesh with a heavier perforated liner has been tested and will be incorporated on all engines as hardware becomes available. Two engines at [redacted] are so configured to date.

25X1A

D. A campaign is underway to replace compressor second stage honeycomb on all engines subsequent to #218 with a coarse cell configuration having an increased "tip clearance," such as incorporated on all engines prior to #219. This change results from three instances of excessive compressor rub sustained on aircraft #121 and #122.

E. Engine performance in terms of thrust and specific fuel consumption is running as specified at takeoff and cruise conditions. Specific fuel consumption is approximately 7% worse than specified at 100% max. thrust at cruise altitudes.

25X1A

F. [redacted]main fuel controls are performing reasonably well. Harrassing problems involving misadjustments are being encountered with early production units. Improvement is being realized in the area of throttle lever torque with various torque negator schemes which are in development and some of which are incorporated on controls now being flight tested. Trim and temperature drop-off have been substantially improved with the new super fast trimmers and pre-set richer fuel flow schedules. Exhaustive engine and control testing has failed to reproduce or define the temperature drop-off encountered in flight confirming the belief that the condition may be installation induced.

25X1A [redacted]3274-63
Page 4

G. Engine power control during inflight refueling which needs further refinement will be pursued by Lockheed and Pratt & Whitney. Some improvement will be realized with the [redacted] fuel control, however the fact remains that with any fuel control the power curve of thrust versus cockpit throttle angle is steep because of the inherent high thrust of the engine, coupled with the existing cockpit throttle quadrant.

H. The first of a block of four engines configured for the [redacted] experimental flight fuel controls will be delivered in October. The [redacted] control itself has completed 1700 hours of full scale engine testing in Florida. With the exception of an undefined nozzle system instability, the [redacted] control is progressing well. Efforts to correct this instability have been and are underway. Engines with plumbing configured for the [redacted] control are not interchangeable with the [redacted] control.

I. The new PWA 523-C fuel specification as written and with the limits set down therein represents the minimum level of quality acceptable to Lockheed and to Pratt & Whitney. (The reason behind this comment made by both C. L. Johnson and [redacted] is that the present sole source supplier of PWA 523-B OXCART fuel for the Government is objecting to the new specification while other potential OXCART suppliers have expressed concurrence with and are delivering fuel meeting the new PWA 523-C specification to Pratt & Whitney in Hartford and Florida for engine acceptance and development testing.)

SIGNED

[redacted]
Aircraft Systems Division
(Special Activities)

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Aircraft Systems Division
(Special Activities)

25X1A [redacted] ASD/OSA:mvp (16 Sep 63)

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